JERABKOVA, L., inz.; VRANA, A., MUDr.; TREFNY, J. MUDr.; REIL, I., prom.mat.

Tuberculosis as a cause of disability in Czechoslovakia. Cesk. zdravot. 9 no.6:358-365 '61.

1. Studijni ustav Statniho uradu socialniho zabezpeceni v Praze, red. dr. L.Brejla (for Jerabkova, Vrana). 2. Vyzkumny ustav tuberkulozy v Praze, red. doc. dr. R.Krivinka.(for Trefny, Reil).
(TUBERCULOSIS statist)

TREFNY, Jiri

Vaginal biocenosis in puberal defloration. Cesk. gyn. 25[39] no.1/2: 89-90 Mr '60.
(PUBERTY) (COITUS)

STYS, Stanislav, inz.; TREFNY, Vlastimil, inz.

Selective stripping of the overburden and rehabilitation of areas devastated by mining in the North Bohemia lignite basin. Uhli 4 no.11:379-383 N '62.

1. Banske projekty, Teplice.

STYS, Stanislav, inz.; TREFNY, Vlastislav, inz.

Importance of the shape of pit heaps for recultivation. Uhli 5 no.8:267-272 Ag '63.

1. Sdruzeni Severoceskych hnedouhelnych dolu, Most (for Stys).
2. Banske projekty, Teplice lazne v Cechach (for Trefny).

BECO, V. Dr.; BRACHFELDOVA, J. Dr.; TREFNY, Z. Dr.

Diagnosis of elevated diaphragm.
Cesk. pediat. 11 no.1:27-31 Feb 56.

1. IV. detska klinika prof. Dr F. Blazka, Praha.
(DIAPHRAGM, dis.
elevation, diag.)

CZECHOSLOVAKIA/Human and Animal Physiology (Normal and Pathological). Respiration. T-5

Abs Jour : Ref Zhur - Biol., No 16, 1958, 74838

Author : Holubar, J., Seliger, V., Trefny, Z.
Inst : -
Title : Lung Ventilation and Requirement of Oxygen During Physical Work in Adults and Adolescents.

Orig Pub : Ceskosl. fysiol., 1957, 6, No 2, 176-181

Abstract : In 29 healthy males adults and 28 boys 14 years old with different degrees of training after stress (work on a veloergometer for 1 minute) pulse rate and respiration decreased faster than the requirement of $O_2$; the coefficient of utilization of $O_2$ often fell significantly lower than normal, especially in those not trained; in the non-trained person after the stress of a minute volume of respiration and especially the requirement of $O_2$ were significantly increased in comparison with the trained.

Card 1/2

CZECHOSLOVAKIA/Human and Animal Physiology (Normal and Pathological). Respiration. T-5

Abs Jour : Ref Zhur - Biol., No 16, 1958, 74839

Author : Holubar, J., Seliger, V., Trefny, Z.
Inst : -
Title : Lung Ventilation and Oxygen Requirement During Physical Work in Adults and Adolescents.

Orig Pub : Physiol. bohemosl., 1957, 6, No 2, 212-217.

Abstract : No abstract.

Card 1/1

TREFNY, Z.

Ventilzation of the lungs and oxygen consumption during physical work in adults and adolescents. p.176.
(Ceskoslovenska Fysiologie, Vol. 6, No. 2, 1957, Praha, Czechoslovakia)

SO: Monthly List of East European Accessions (EEAL) LC. Vol. 6, No. 9, Sept. 1957. Uncl.

TREFNY, Z.; SMETANKA, E.

A new principle for the use of the piezoelectricity in ballistocardiography. p. 487. (CESKOSLOVENSKA FYSIOLOGIE, Vol. 5, No. 4, 1956, Praha, Czechoslovakia)

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, No. 12, Dec 1957. Uncl.

3

**A continuous polarographic method of determining oxygen consumption in man.** V. Podroužek, V. Seliger, and Z. Třefný. *Českoslov. Fysiol.* **3**, 430–1(1954); *Excerpta Med.*, Sect II, 8, 658(1955). — A special capillary, bent at a right angle, with a dropping rate of 0.38 sec. is used as dropping electrode. The expired air is bubbled through 3 ml. of 0.1 N KCl in a special vessel at the rate of 100 ml./min. The current is registered continuously at 1.4 v. K. L. C.

TREFNY, Z.; SMETANKA, E.

New principle of usage of piezo-electric appliance in ballistocardiography. Cesk. fysiol. 5 no.4:487-489 1956.

1. IV. Detska Klinika lekarske fakulty KU, Poliklinika 2.
(BALLISTOCARDIOGRAPHY, apparatus and instruments,
piezo-electric appliance (Cz))

**TREFNY, Z.**

Development of gas exchange during the 1st few days of life.
Cesk. pediat. 20 no.11:1009-1010 N '65.

1. Katedra fyziologie ITVS v Praze (vedouci doc. dr. V. Seliger, CSc.) a Obvodni ustav narodniho zdravi (reditel MUDr. K. Woydinek).

TREFNY, Z.; REIL, I.

Apropos of the determination of total body fats in newborn infants. Cesk. pediat. 20 no.11:1011 N '65.

1. Katedra fyziologie ITVS v Praze (vedouci doc. dr. V. Seliger, CSc.), Obvodni ustav narodniho zdravi v Praze 9 (reditel MUDr. K. Woydinek) a Vyzkumny ustav tuberkulozy v Praze (reditel doc. dr. R. Krivinka).

KUNCOVA, Zdenka; PAVLASKOVA, Irena; TREFNY, Zdenek; TROCHOVA, Katerina

Seaside treatment of asthmatic children. Cesk.pediat. 15 no.9: 778-781 S '60.

1. Detske oddeleni Fakultni polikliniky v Praze 2, prednostka MUDr. Zdenka Kuncova.

(ASTHMA in infancy & childhood)
(CLIMATE ther.)

Country : Czechoslovakia
Category : Human and Animal Physiology, Circulation

Abs. Jour. : Ref Zhur Biol., No. 2, 1959, No. 8041

Author : Trefny Z., Smetanka E.
Inst. : --
Title : A New Principle for the Application of the Piezoelectric Method in Ballistocardiography.

Orig Pub. : Ceskosl. fysiol., 1956, No. 4, 487--489

Abstract : no abstract

Card: 1/1

SELIGER, V.; TREFNY, Z.

Oxygen requirement and pulmonary ventilation in children during physical work of 3 levels of intensity. Cesk. fysiol. 8 no.3:244-245 Apr 59.

1. Ustav telovychovneho lekarstvi a IV. detska klinika fakulty vseobecneho lekarstvi KU, Praha. Predneseno na III. fysiologickych dnech v Brne, dne 14. 1 1959.

(RESPIRATION, physiol.
eff. of work in child. (Cz))
(WORK, eff.
on resp. in child. (Cz))

HOLUBAR, J.; SELIGER, V.; TREFNY, Z.

Pulmonary ventilation and oxygen requirement during physical work in adults and adolescents. Cesk. fysiol. 6 no.2:176-181 1957.

1. Laborator grafickych vysetrovacich method Cs. Akademie ved, fysiologicke oddeleni Ustavu telov ychovneho lekarstve a lv. detska klinika fakulty vseobecneho lekarstvi Karlovy university, Praha.
(EXERCISE, effects,
on pulm. ventilation & oxygen requirements in adults & adolescents (Cz))
(RESPIRATION, physiology,
ventilation & oxygen requirem.,eff. of exercise in adults & adolescents (Cz))

TREFNY, Z.

HOLUBAR, J.; DELIGER, V.; TREFNY, Z.

Ventilation of the Lungs and Oxygen Consumption in Physical Exercise in Adults and Adolescents. Physiol. bohem. 6 no.2: 212-217 1957.

1. Laboratory of Graphic Methods of Examination, Czechoslovak Academy of Science, Physiology Department of the Medical Institute of Physical Culture, Fourth Children's Clinic, Faculty of General Medicine, Charles University, Prague.

(RESPIRATION, physiol.
eff. of phys. exercise on lung ventilation in adults & adolescents)
(METABOLISM
oxygen consumption, eff. of phys. exercise in adults and adolescents)
(EXERCISE, eff.
on lung ventilation & oxygen consumption)

VACEK, J., MUDr.; TREFNY, Z., MUDr.

Obstetric and pediatric considerations on delivery of large infants. Cesk. gyn. 19 no.5:317-323 Sept 55.

1. I. porodnicka klinika, prednosta prof. Dr. Lukas. IV. detska klinika, prednosta prof. Dr. Blazek.
(DELIVERY,
of large inf., obst. & pediatric aspects.)

TREFNY, Z

KRUML, J;PREROVSKY, I;TREFNY, Z;ZUFNICKOVA, J.

Slide method in culture of tubercle bacilli. Cas. lek. cesk. 89 no.30:841-844 28 July 1950. (CIML 20:1)

1. Of the Bacteriological and Serological Department in Bulovce (Head--J. Viklicky) and of the Institute for Clinical Physiology of the Medical Faculty of Charles University, Work Group of V. Kurti (Head--Prof. J. Skladal, M. D.).

TREFNY, Zdenek

TREFNY, Zdenek, MUDr

[illegible]

New diagnostic methods in pneumology in children. Prakt lek., Praha 34 no.15-16:358-361 5 Aug 54.

1. IV. detska klinika prof. Dr. F.Blazka
(RESPIRATORY TRACT, diseases
*in child., diag. methods)

SELIGER, Vaclav; TREFNY, Zdenek

Contribution to the problem of oxygen requirement and pulmonary ventilation in standard performance in children. Cesk. pediat. 16 no.4: 336-342 Ap '61.

1. Subkatedra fyziologie ITVS fakulty KU Praha a OUNZ 9, Praha.

(RESPIRATION physiol) (EXERTION)

L 34185-66 EWT(d)/EWT(m)/EWP(t)/ETI/EWP(k)/EWP(h)/EWP(l) JP

ACC NR: AP6026023 SOURCE CODE: UR/0418/66/000/001/0041/0043

AUTHOR: Tanklevskiy, I. G. (Engineer); Trefnyak, V. (Engineer)

ORG: none

44
B

TITLE: Investment casting of precision blanks

SOURCE: Tekhnologiya i organizatsiya proizvodstva, no. 1, 1966, 41-43

TOPIC TAGS: metal casting, precision instrument industry, foundry equipment, excavator, excavating machinery, paraffin wax, metal forming press, hydraulic equipment, industrial automation, production engineering, mechanical engineering/E 153 excavator

ABSTRACT: This article is a report on investment casting at the "Krashyy Ekskavator" Plant in Kiev. The precision casting section in the steel foundry of this plant has a capacity of 120 tons per year. Castings turned out by this section are parts used in the mass-produced E-153 excavator which were previously produced by sand casting, stamping and fabricating with a great deal of subsequent machining. The average weight of a single casting is 0.32 kg. About 10,000-15,000 pieces are produced per year.

The wax used in the process contains 75% parafin, 15% peat wax and 10% lignite wax. This material fills the form well and gives a high quality pattern. Forms filled with this wax may be cooled more quickly which increases productivity. Patterns made of this composition are less susceptible to the effect of ambient

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UDC: 621.74.04

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ACC NR: AP6026023

D

temperature which is especially important during the summer. This in turn made it possible to reduce the cross sections of the gates and facilitated removing rods left by the rischs. Some 60 kg of parafin, 12 kg of peat wax and 8 kg of lignite wax are used per ton of casting. Manual presses have been replaced by pneumatic presses and the working area has been efficiently organized: the pneumatic presses are placed on a special table with built-in tanks for heating the injectors, vats with running water for cooling the press forms and a gutter for keeping the patterns in running water. New methods and equipment have been introduced for subjecting the pattern to fluidized bed of sand which improves the surface finish of holes, makes it possible to produce small holes in the casting with diameters of 2-3 mm, and also eliminates the manually operated horizontal sand drum.

Since most of the castings made in this section are parts of the hydraulic system in the excavator and require thorough cleaning of the internal cavities, chemical heat treatment in a boiling 50% solution of KOH is used. An automatic cleaning line with alkali vats is presently being put into operation at the plant. Systematic improvement in technology and introduction of the methods and equipment described in this paper have reduced the cost per ton of precision casting by 72 rubles and increased the productivity of a single worker from 3.1 to 5.2 tons per year. Orig. art. has: 3 figures. [JPRS: 35,432]

SUB CODE: 13, 05, 11 / SUBM DATE: none

Card 2/2 BLG

SADOMSKIY, A.L., inzh.; BORODYANSKIY, L.Ye., inzh.; TREFNYAK, V.A., inzh.

Making steel castings with easily separated risers. Mashinostroenie no.4:69-70 Jl-Ag '65. (MIRA 18:8)

SUBBOTINA, G.V.; TREFPLOV, I.S.

A listing of studies on magnetic elements of automatic control and computer engineering for 1961. Avtom.i telem. 24 no.1:119-130 Ja '63. (MIRA 16:1)

(Bibliography--Automatic control)
(Bibliography--Magnetic materials)
(Bibliography--Electronic computers)

TREGER, Prof. MUDr.; MOYS, A., MUDr.; MUZIKOVA, M., RND.; CICVARHK, Z., MUDr.; IVASKO, L.; SINTAJ, M., MUDr.

Further experiences in the treatment of Leiner-Mossons disease with potassium sulphate. Cesk.pediat. 11 no.2-3:145-148 Mar 1956.

1. Z dermatovenerlogicej kliniky UK v Bratislave, prednnosta prof. Dr. J.Treger z I. detskej kliniky UK v Bratislave, prednosta doc. Dr I.Jakubcova.

(ERYTHRODERMA DESQUAMATIVUM, ther.
potassium sulphate)
(SULFATES, ther. use
potassium sulfate in erythroderma desquamativum)
(POTASSIUM
potassium sulfates, ther. of erythroderma desquamativum)

TREGER, D.

Contribution to solving the problem of electronic amplifiers. p. 73
(Strojnoelektrotechnicky Casopis. Bratislava. Vol. 3, no.1 1952)
SO: Monthly List of East European Accessions, (EEAL), LC, Vol. 4, No. 6,
June 1955, Uncl.

[illegible]

BOER, Vasile; TAMAS, Ghizela; TREGER, Elza; NICOARA, Ioan; KAZSA, Ladislau;
KERESTELY, Ioan

Hemagglutination inhibition tests in viral hepatitis. Stud.cercet. inframicrobiol., Bucur. 5 no.1-2:98-100 Jan-June 54.
(HEPATITIS, INFECTIOUS, diagnosis,
hemagglut. inhib. tests)
(HEMAGGLUTINATION,
inhib. tests in infect. hepatitis)

CZECHOSLOVAKIA

SCHRAMM, A; TREGER, J

Second Surgical Clinic (II. chirurg. klin.),
LF UK, Bratislava - (for both)

Bratislava, Lekarsky obzor, No 5, May 1966,
pp 273-278

"Our experience with panthotenic acid in the
treatment of adynamic ileus."

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CZECHOSLOVAKIA

SCHRAMM, A; TREGER, J

Second Surgical Clinic (II. chirurg. klin.), LF UK, Bratislava - (for both)

Bratislava, Lekarsky obzor, No 5, May 1966, pp 273-278

"Our experience with panthotenic acid in the treatment of adynamic ileus."

TREGER, L.

Crankshaft turning without dismantling the engine; Dzerzhinskii Ship Repair Yard in Tuapse. Inform.sbor.TSNIIMF no.26:74-79 '58.. (MIRA 13:4)

1. Tuapsinskiy sudoremontnyy zavod imeni Dzerzhinskogo.
(Tuapse--Shipyards) (Cranks and crankshafts)

TREGER, I.

7

Changes caused by *p*-dimethylaminoazobenzene and by the tumorogenic sodium salt of melanin in the period preceding cancerization. L. Harangby, F. Gyergyay, E. Balogh, A. Antalffy, L. Róna, St. Sándor, and T. Tréger. *Acad. rep. populare Romîne, Filiala Cluj, Studii, cercetări ştiinţ.* 4, 338-55(1953).—By treating different groups of rats with *p*-dimethylaminoazobenzene (I) and with tumorogenic sodium salt of melanin (II) it was observed that I does not stimulate proliferation and that cancerogenic aromatic hydrocarbons cause cellular necrosis. The proliferations appearing in the liver are secondary processes caused by cellular necrosis. The pronounced reticular changes observed can be considered as a morphological manifestation of the beginning of an antitumorous immunity. The permanent alterations of the liver which precede the tumor are produced by the cancerogenic compds. or II. The addn. of cholesterol to I increases the harmful effect. The effect of II is similar to that of I and constantly appears 1st in the liver.

Emanuel Merdinger

RUMANIA

BURMAZ, M., Dr, Col, TREGER, T., Dr, Lt-Col, MACAVEI, Gh., Dr, Lt-Col, and MIHAI, M., Dr, Lt-Col [affiliation not given]

"Some Considerations Concerning the Treatment of Malignant Tumors."

Bucharest, Revista Sanitara Militara, Vol 17, No 1, Jan-Feb 66, pp 65-76.

Abstract: An analysis of the 227 cases of malignant tumors treated in the surgical section of the Cluj Military Hospital in 1959 through 1963. The cases are classified according to localization, sex, and type of treatment, and the results obtained are compared with those reported in the literature.

Includes 2 tables and 22 references, of which 14 are Rumanian, 3 German, one Belgian and 4 English-language. -- Manuscript submitted 19 July 1965.

1/1

L 07152-67 EWP(k)/EWT(d)/EWT(m)/EWP(h)/EWP(l)/EWP(w)/EWP(v)/EWP(t)/ETI IJP(c)

ACC NR: AP7001004 JD/HW SOURCE CODE: UR/0383/66/000/003/0036/0038

**BARZIY, V. K., TREGER, Ye. I.**

37
35

"Tests of Steel 9Kh1SVF Working Rolls for Cold Rolling"

Dnepropetrovsk, Metallurgicheskaya i Gornorudnaya Promyshlennost', No 3, May-Jun 66, pp 36-38

Abstract: Working rolls 400X1200 mm in diameter made at the Elektrostal' Plant of Heavy Machine Building from the new 9Kh2SVF steel developed by the Central Scientific Research Institute of Technology and Machine Building have been used since 1962 on the reversible 1200 cold rolling mill at the "Zaporozhstal'" Plant used basically for rolling low-carbon sheet and transformer steel. The new grade of steel has the following chemical composition (%): C 0.8-0.9 Mn 0.2-0.3 Si 1.2-1.8 Cr 1.9-2.1 N<0.15 W 0.4-0.6 V 0.1-0.2

According to data put out by the Central Scientific Research Institute of Technology and Machine Building, this steel differs from 9Kh2 steel in having higher hardenability, structural stability under the effect of temperature and pressure and increased resistance to surface marring. The use of 9Kh2SVF steel made it possible to increase the annealing temperature of the rolls from 160-180°C to 200-220°C thus reducing the level of internal stresses produced by the use of industrial-frequency current for hardening while maintaining the same hardness in the surface layer of the roller as produced by annealing at 160-180°C for rolls

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ACC NR: AP7001004

2

made from 9Kh2 steel. Data from years 1962-1965 show a 45-78 per cent higher stability for rolls made from steel 9Kh2SVF than from 9Kh2 steel. This is due to a slight increase in the effectiveness of the hardened layer (determined in tons of rolled metal per millimeter of reduction in roll diameter) a higher degree of utilization of the working layer of the rollers (determined in millimeters of reduction in roll diameter befor failure) for 9K2SVF steel in comparison with rolls made from 9Kh2 steel. The introduction of rolls made from this type of steel on other cold rolling mills will undoubtedly result in a reduction of roller wear per tone of cold-rolled sheet which is especially important for continual intensification of sheet-rolling production. Orig. art. has: 1 figure and 3 tables. [JPRS: 37,111]

ORG: none

TOPIC TAGS: cold rolling, rolling mill, steel / 9Kh1SVF steel

SUB CODE: 13,11 / SUBM DATE: none

Card 2/2 mLE

TREGER, Yu.A.; FLID, R.M.; ANTONOVA, L.V.; SPEKTOR, S.S.

Complex formation of allyl chloride and allyl alcohol with monovalent copper salts. Zhur.fiz.khim. 39 no.11:2831-2835 N '65. (MIRA 18:12)

VIRIN, L.I.; SAFIN, Yu.A.; TREGER, Yu.A.; DZHAGATSPANYAN, R.V.

Mass spectra and structure of some allyl derivatives. Zhur.fiz. khim. 39 no.11:2824-2826 N '65.

(MIRA 18:12)

TREGER, Yu.A.; FLID, R.M.; SPEKTOR, S.S.

Solubility of allyl chloride in water and in aqueous solutions of HCl. Zhur. fiz. khim. 38 no.2:478-481 F '64.

(MIRA 17:8)

MARKOVSKIY, F.T.; TREGUB, A.P.; KRAVERS, A.D., kand. tekhn.
nauk, dots., red.; ORLOVA, L.I., red.izd-va;
PRUS'YAN, L.F., red.izd-va; SHCHETININA, L.V., tekhn.
red.

[General electrical engineering] Obshchaia elektrotekhnika.
Moskva, Mashgiz, 1963. 331 p. (MIRA 17:2)

TREGUB, F.S.

Registration of the detonation moment from signals of the exact time in operations using the deep seismic sounding method. Geofiz. razved. no.11:15-20 '63. (MIRA 16:8)

(Seismology)

TREGUB, F.S.; PUSHKAREV, N.K.

Change in the design of the tape-winding mechanism on the OS-60 oscillograph for operations using the correlation reflected wave method and deep seismic probing. Geofiz. razved no.11:85-89 '63. (MIRA 16:8)

(Seismic prospecting—Equipment and supplies)

BAZ' Grigoriy Averkovich; MUROMTSEV, Gennadiy Petrovich; RAINKIN,
Aleksandr Nikolayevich; TREGUB, Iosif Konstantinovich;
TSIKUNOV, Kirill Andreyevich; Prinimal uchastiye BULYBENKO,
V.Yu.; MILENIN, V.G., dots., kand. tekhn. nauk, red.;
PODGUZOV, M.I., red.; MEDNIKOVA, A.N., tekhn. red.

[Design of pulse networks] Raschet impul'snykh skhem. [By]
G.A.Ba' i dr. Izd.2., dop. i perer. Moskva, Voen. izd-vo
M-va obor. SSSR, 1962. 267 p. (MIRA 15:3)
(Pulse circuits)

TREGUB, I.K

PHASE I BOOK EXPLOITATION SOV/4362

Baz', Grigoriy Averkovich, Gennadiy Petrovich Muromtsev, Aleksandr Nikolayevich Rainkin, Iosif Konstantinovich Tregub, and Kirill Andreyevich Tsikunov

Raschet impul'snykh skhem (Design of Pulse Circuits) Moscow, Voyenizdat, 1960. 237 p. No. of copies printed not given.

Ed. (Title page): V.G. Milenin, Candidate of Technical Sciences, Docent; Ed. (Inside book): M.I. Podguzov; Tech. Ed.: A.N. Mednikova.

PURPOSE: This textbook is intended for the specialist radio engineer who is assumed to be acquainted with the theories of the calculated circuits.

COVERAGE: The authors make an attempt to systematize engineering calculations of basic pulse circuits, and, as a basis for calculations, use the graphic-analytical method. Sections 1 and 3 of Chapter I and Section 1 of Chapter II were written by K.A. Tsikunov; Section 2 of Chapter I and also Section 3 of Chapter II by G.P. Muromtsev; Section 2 of Chapter II, and Chapter III by G.A. Baz'; Sections 4 and 5 of Chapter II by A.N. Rainkin; Chapter IV by I.K. Tregub. Design of the phantastron circuit was done by V.Yu. Bulybenko. There are 24 references, all Soviet.

Card ~~1/5~~

TREGUB, I. K., Cand Tech Sci--(diss) "Analysis of ~~the~~ processes in ~~the~~ blocking-generators on flat semi-conductor triodes." Kiev, 1958. 12 pp (Min of Higher Education USSR. Kiev Order of Lenin Polytech Inst)

(KL,30-58,128)

BAZ', Grigoriy Averkovich; MUROMTSEV, Gennadiy Petrovich; RAINKIN, Aleksandr Nikolayevich; TREGUB, Iosif Konstantinovich; TSIKUNOV, Kirill Andreyevich. Prinimal uchastiye BULYBENKO, V.Yu., MILENIN, V.G., dotsent, kand.tekhn.nauk, red.; PODGUZOV, M.I., red.; MEDNIKOVA, A.N., tekhn.red.

[Calculation of pulse systems] Raschet impul'snykh skhem. Pod red. V.G.Milenina. Moskva, Voen.izd-vo M-va obor.SSSR, 1960. 237 p. (MIRA 13:5)

(Pulse techniques (Electronics))

82858

S/112/60/000/008/007/012

9.4310

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1960, No. 8, p. 356, # 5.4302

AUTHOR: Tregub, I.K.

TITLE: Pulse Properties of Junction Transistors 25

PERIODICAL: Tr. Sektsii poluprovodnik. priborov. Ukr. resp. pravl. Nauchno-tekhn. o-va radiotekhn. i elektrosvyazi, 1958, No. 1, pp. 74-82

TEXT: The author investigates the quasistatic pulse characteristics of junction transistors under the conditions of high signals. He presents a circuit for obtaining the characteristics in the system $i_c = f(i_b, U_c)$ and $U_b = (i_b, U_c)$ for a circuit with a common emitter. For the П2Б (P2B) transistor the measuring results are given for variations of the base current from 0 to 700 milliamps. In this case, the pulse repitition rate of the input current is equal to 700 cps with a pulse duration of 30 $\mu$sec. Graphs are presented of the function $i_c(U_c)$, of the output resistance $r_c(i_b)$ and of the coefficient of current amplification $\beta (i_b)$, $R_{in} (i_b)$, $f_\alpha (i_b)$. It was found that the collector resistance under high current conditions reaches magnitudes in the order of kiloohm units. $\beta$ drops to magnitudes which are less than this unit. $R_{in}$ is lowered to ohm units. The

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82858

Pulse Properties of Junction Transistors S/112/60/000/008/007/012

rate of the transient processes increases. If $i_b$ = 10 milliamps the rise time of the collector current is equal to 3 $\mu$sec, while with $i_b$ = 400 milliamps, this time is equal to 0.5 $\mu$ sec.

T.N.Ya.

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

TREGUB, I.T. (Odessa)

Improving the methodology of intravenous urography. Vest. rent. i rad. 39 no.4:80-81 Jl-Ag '64. (MIRA 18:7)

SMOLYAK, V.A., kand.tekhn.nauk; YASHIN, Yu.F., inzh.; UZLYUK, V.N., inzh.;
Prinimali uchastiye: BALYUK, F.B.; KONOVALOV, M.S.; SEL'DYAKOV,
M.I.; TREGUB, N.G.; POLOVCHENKO, Yu.I.; KHODOROVSKIY, S.S.;
CHERNYY, A.A.; YEVSEYEV, A.N.; KOVALENKO, I.A.

Radiometric investigation of blast furnace tuyere zones. Stal'
21 no.9:777-782 S '61. (MIRA 14:9)

1. Dneprodzerzhinskiy metallurgicheskiy zavod-vtuz i Zavod im.
Dzerzhinskogo.

(Blast furnaces)

[illegible]

TOPIC TAGS: stretching, chain stretcher

Card 1/2

TREGUB, S.I., kandidat meditsinskikh nauk; GENINA, N.P.; BABULINA, Z.M.

Use of scalp forceps according to Ivanov's technic in the L'vov obstetric clinic at the Institute of Mother and Child Welfare. Akush. i gin. 33 no.2:28-31 Mr-Ap '57. (MIRA 10:6)

1. Iz akushersko-ginekologicheskogo otdela (nauchnyy rukovoditel' - doktor meditsinskikh nauk A.I.Vylegzhanin) L'vovskogo instituta okhrany materinstva i detstva (dir. I.D.Yashchuk).

(DELIVERY
forceps, indic. & technic)

TREGUB, S.I. [Trehub, S.I.], kand.med.nauk

Problem of "tuberculosis and pregnancy." Ped., akush. i gin. 22 no.4:46-49 '60. (MIRA 14:5)

1. L'vovskiy nauchno-issledovatel'skiy institut okhrany materinstva i detstva (direktor - kand.med.nauk L.Ya.Davidov).
(PREGNANCY, COMPLICATIONS) (TUBERCULOSIS)

ROZENBOYM, G.B., inzh.; SEREBRENNIKOVA, Ye.A., inzh.; TREGUB, Ye.S., inzh.

Enamel lactate films for finishing ship structures. Sudostroenie 27 no.12:49-51 D '61. (MIRA 15:1)
(Protective coatings) (Shipbuilding)

KRASNIKOV, Makar Filippovich; TREGUBA, Semen Grigor'yevich
[Trehuba, S.H.]; KIR'YAKOV, Yu.F., red.; GORBUNOVA, N.M.
[Horbunova, N.M.], tekhn. red.

[Kharkov Province; a geographical sketch]Kharkivs'ka oblast'; geografichnyi narys. Kyiv, Radians'ka shkola, 1962. 101 p. (MIRA 16:1)

(Kharkov Province--Economic geography)

TREGUBENKO, A.; SPERANSKIY, V.

Electroslag remelting. NTO 2 no.8:10-11 Ag '60. (MIRA 13:10)

1. Direktor zavoda "Dneprospetsstal'" (for Tregubenko). Nachal'nik tekhnicheskogo otdela zavoda "Dneprospetsstal'" (for Speranskiy).
(Steel--Metallurgy)

SAMARIN, A.M.; NOVIK, L.M., kandidat tekhnicheskikh nauk; GONCHARENKO, N.I., kandidat tekhnicheskikh nauk; TREGUBENKO, A.F., inzhener.

Vacuum treatment of molten metal. Stal' 16 no.8:700-707 Ag '56. (MLRA 9:10)

1.Chlen-korrespondent Akademii nauk SSSR (for Samarin).
(Steel--Metallurgy)

TREGUBENKO, A.F.

133-10-1/26

AUTHOR: Tregubenko, A. F., Director of Dneprospetsstal' Plant

TITLE: Glorious 25th Anniversary.

PERIODICAL: Stal', 1957, No.10, pp. 865-867 (USSR).

ABSTRACT: A short outline of the activities of the above works during their 25 years existance is given. No definite data are given.

AVAILABLE: Library of Congress

Card 1/1

CHUYKO, N. M., KADINOV, E. I., TREGUBENKO~~, A. F.~~
Dniepropetrovsk Institute of Metallurgy.

"Influence of the Vacuum Stream Treatment on the Quality of MX 15-Steel"

paper presented at Second Symposium on the Application of Vacuum Metallurgy.

July 1958, Moscow

SOV/137-58-9-19009

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 124 (USSR)

AUTHORS: Starodubov, K.F., Tregubenko, A.F., Yudovich, S.Z., Kolesnik, B.P., Lobarev, M.I.

TITLE: Combatting Decarburization by Induction Heating of Alloy-steel Billets Before Rolling (Primeneniye induktsionnogo nagreva zagotovok legirovannoy stali pered prokatkoy v tselyakh bor'by s obezuglerozhivaniyem)

PERIODICAL: V sb. Metallovedeniye i term. obrabotka. Moscow, Metallurgizdat, 1958, pp 39-49

ABSTRACT: A description is offered of experiments in induction heating in advance of rolling without decarburization of the billets (105x105x1000 mm) made of 60S2A, ShKh15 and U12A steels. It is established that two-frequency heating (50 cps up to the Curie magnetic-transformation point and then 500 cps) is optimal. Because the plant lacked a 500-cycle motor-generator set, induction heating was performed only at 50 cps, the current being taken from a 15,000-kva transformer. The design of the inductor is described. The drawings show the changes in electrical parameters and temperature in accordance with

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SOV/137-58-9-19009

Combatting Decarburization by Induction Heating of Alloy-steel (cont.)

heating time. The time required to heat the billet to 1080°C for rolling was 170 seconds in the case of 60S2A; 250 seconds were required to heat ShKh15 steel to 1150°. Under these conditions, the temperature drop across the section of the billet came to 200 and 120°, respectively, with 188 and 282 kwh/t of electrical energy consumed. Metallographic investigation showed decarburization and oxidation on the surface of the billet to be lacking. The structure of the ShKh15 steel did not change, but grain growth occurred in the 60S2A steel (by 2 or 3 points). A design is being developed for industrial application of induction heating under which the billets will be heated to 700-800° in gas furnaces and the rest of the way by 2500-cycle high-frequency current.

F.U.

1. Induction generators--Design 2. Induction generators--Performance
3. Steel--Induction heating

Card 2/2

TREGUBENKO, A. F.

18.3200

[illegible]
SOV/133-59-10-15/39

**AUTHORS:** Vorob'yeva, T. M., Zabaluyev, I. P., Kalinnikov, Ye. S., Tregubenko, A. F.

**TITLE:** Effects of Vacuuming on the Quality of 30KhGSNA and ShKh15-Type Steels

**PERIODICAL:** Stal', 1959, Nr 10, pp 904-907 (USSR)

**ABSTRACT:** At "Dneprospetsstal'" Plant (zavod "Dneprospetsstal'") experimental vacuuming was conducted by Dobkov, T. M., Shamil', Yu. P., Parkhomenko, G. F., Shabli, N. M., and Men', A. N., according to the following methods: (1) 10 melts, at normal rimming with a minimum oxidation of 0.50% C and ladle pouring, placed in a vacuum chamber; (2) 10 melts, at maximum oxidation of 0.31% C during rimming, otherwise treated as above; and (3) 8 melts poured without vacuuming. The authors draw the following conclusions based on experimental data: (1) Vacuum treatment of molten metal at 4 to 5 t/min speed of entering vacuum chamber lowers hydrogen content. In 30KhGSNA-steel specimens molten within a limited rimming period

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and poured at 28 mm mercury column the hydrogen content dropped by an average 16%; in melting with normal rimming and pouring at 26 mm mercury column it dropped 18%. In steel-ShKh15 specimens poured at 20 mm mercury column a 28% decrease of hydrogen was observed. (2) The quality of 30KhGSNA steel, especially in respect to impact toughness, improved in pouring under vacuum at a residual pressure of 26 to 28 mm mercury column. (3) In pouring at residual pressure of about 20 mm mercury column the quality of ShKh15 steel shows no improvement in regard to nonmetallic inclusions. (4) Decreased oxidizing period in melting 30KhGSNA steel by a reduction of the quantity of oxidizing carbon from 0.50 — 0.70 to 0.20 — 0.30% does not increase gas saturation or impair quality, and even promotes impact characteristics. There are 4 tables; and 3 Soviet references.

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SOV/125-12-4-9/18

18(5). 25(1)

AUTHOR: ~~Tregubenko, A.F.,~~ Engineer, and Speranskiy, V.G.

TITLE: Electric Slag Remelting of Steel in the Factory "Dneprospetsstal'", Zaporozh'ye.

PERIODICAL: Avtomaticheskaya svarka, 1959, Vol 12, Nr 4, pp 71-83 (USSR)

ABSTRACT: The article describes a new furnace, which is working since May 1958 in the factory "Dneprospetsstal'". The furnace was planned and produced by the Institute for Electric Welding (Institut elektrosvarki) [Ref 1, 2,3]. To introduce the electric slag process, a fusing agent type AN-25 was used, which is electric conductive in solid state. For developing the "slag tub" in most cases, the fusing agent type NF-6 (system: $CzF_2 - Al_2O_3$) was used. 288 ingots of steel were remelted, 181 of them ball bearing steels (ShKh 15 and ShKh 15 SG). 19 of the others were EI 654, 16 [illegible], 9 - 38 KhMYuA, 10 - IKh18N9T, 19 - ingots of rapid steel (R 18 and R18M), the rest - 2Kh13, 18KhNVA,

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SOV/125-12-4-9/18

Electric Slag Remelting of Steel in the Factory "Dneprospectsstal'"

Kh17N2. The "electric slag" remelting decreases soiling by non-metal substances. One gets a much better macro-structure of the metal and in hot state a higher plasticity. In the steel type 1Kh18V9T, the ferrite-component decreases. In rapid steels also the carbide heterogenity increases. The contents of sulphur is greatly decreased by the process of remelting. There are 9 photographs, 1 diagram, 4 tables and 4 Soviet references.

ASSOCIATION: Elektrometallurgicheskiy zavod "Dneprospetsstal'" im. A.N. Kuz'mina (Electric and Metallurgical Factory "Dneprospetsstal'" imeni A.N. Kuz'min )

SUBMITTED: January 19, 1959

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TREGUBENKO, A.E.

PHASE I BOOK EXPLOITATION SOV/4548

Akademiya nauk SSSR. Komissiya po fiziko-khimicheskim osnovam proizvodstva stali

Primeneniye vakuuma v metallurgii (Use of Vacuum in Metallurgy) Moscow, Izd-vo AN SSSR, 1960. 334 p. Errata slip inserted. 4,500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut metallurgii imeni A.A. Baykova. Komissiya po fiziko-khimicheskim osnovam proizvodstva stali.

Resp. Ed.: A.M. Samarin, Corresponding Member, Academy of Sciences USSR; Ed. of Publishing House: G.M. Makovskiy; Tech. Ed.: S.G. Markovich.

PURPOSE: This collection of articles is intended for technical personnel interested in recent studies and developments of vacuum steelmaking practice and equipment.

COVERAGE: The book contains information on steel melting in vacuum induction furnaces, and vacuum arc furnaces, reduction processes in vacuum, and degassing of steel and alloys. The functioning of apparatus and equipment, especially vacuum furnaces and vacuum booster pumps is also analyzed. Personalities are mentioned in connection with some of the articles and will appear in the Table of Contents. Three articles have been translated from English. Some of the

Kazachkov, I.P., and S.I. Khitrik. Effect of Vacuum Treatment [in a Ladle] of the Carbonless Ferrochrome on the Amount of Its Oxide Inclusions 127

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Chuyko, N.M., A.F. Tregubenko, and Ye.I. Kadinov. The Effect of Vacuum Treatment of Metal Pouring on the Quality of ShKh15 Steel [the work was performed by the Dnepropetrovskiy metallurgicheskiy institut (Dnepropetrovsk Metallurgical Institute) and the "Dneprospetsstal'" (Dnepr Special Electrical Steel Mill, in Zaporozh'ye) with the participation of engineers V.B. Rutkovskiy, M.P. Konishchev, T.M. Bobkov, L.U. Barash, A.N. Men', Yu.P. Shamil', A.I. Khitrik, P.A. Zhalo, Yu.P. Valovich and G.P. Parkhomenko] 189

Tolstoguzov, N.V., V.N. Konovalov, A.N. Glazov, L.I. Zeder, M.G. Chudorovich, P.M. Danilov and Ye.N. Shirinkin. Vacuum Treatment of Molten Transformer Steel and of ShKh15 Steel [A.S. Shtepa, L.S. Klimasenko, P.S. Plekhanov, V.I. Mesyats, V.Ye. Pashchenko and P.A. Mironov participated in the work] 196

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Zhak, G. [Polish People's Republic, Institute of Iron Metallurgy in Gliwice]. Vacuum Melting and Pouring of Alloyed Carbon Steel 219

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Musikhin, V.I., O.A. Yesin, and B.M. Lepinskikh. The Effect of Hydrogen and Nitrogen on the Activity of Silicon in Molten Cast Iron 248

Marmer, E.N. Investigation of Gas Liberation and Penetrability of Ceramics in Vacuum 251

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18.3200

AUTHORS: Shul'te, Yu. A. (Doctor of Technical Sciences, Professor), Tregubenko, A. E., Smolyakov, V. F., Maksimenko, V. D., Frantsev, V. P., Leybenzon, S. A., Garevskikh, I. A.

TITLE: Electrometallurgy. Electroslag Remelting of Ball Bearing and Structural Chromium-Nickel-Tungsten Steels

PERIODICAL: Stal', 1960, Nr 1, pp 45-50 (USSR)

ABSTRACT: This is a description of a study of technology of electro-
slag remelting of ShKh15, ShKh15SG, and 18KhNVA steels.
The chemical composition of these steels (%) is as follows:
ShKh15, C, 0.95-1.10; Mn $\leq$ 0.4; Si $\leq$ 0.35; Cr, 1.30-1.60;
S $\leq$ 0.020; P $\leq$ 0.027; Ni $\leq$ 0.3; Cu $\leq$ 0.25; ShKh15SG, C,
0.90-1.10; Mn, 0.20-0.40; Si, 0.15-0.35; Cr, 1.30-1.65;
S $\leq$ 0.020; P $\leq$ 0.027; Ni $\leq$ 0.3; Cu $\leq$ 0.25; and
18KhNVA, C, 0.14-0.21; Mn, 0.25-0.55; Si, 0.17-0.37; S $\leq$
0.03; P $\leq$ 0.035; Cr, 1.35-1.65; Ni, 4.00-4.50, W,
0.8-1.20. Yu. V. Latash and B. I. Maksimovich of the

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Electrometallurgy. Electroslag Remelting of Ball Bearing and Structural Chromium-Nickel-Tungsten Steels

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Institute of Electric Welding imeni Ye. O. Paton (Institut elektrosvarki imeni Ye. O. Patona) and N. A. Stetsenko of the "Dneprospetsstal'" Plant (zavod "Dneprospetsstal'") participated in the work. For industrial testing of the new method of electroslag remelting, developed by the Institute of Electric Welding imeni Ye. O. Paton, of the Academy of Sciences of the UkrSSR, a furnace, designed and built by the Institute, was transferredin May, 1958, to the "Dneprospetsstal'" Plant. It was considered advisable to check the degree of purity of metal (the nonmetallic inclusions) on ball bearing steel and the mechanical properties on the structural 18KhNVA used for the most critical applications. All test melts were conducted on R909 installation. The inside diameter of crystallizer was 200 and 250 mm. The remelting was done using the 80-150 mm rods (electrodes). The weight of ingot

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was 340 kg maximum. The investigation of ball bearing steel consisted of a study of 92 melts of ShKh15 steel ingots and of 90 melts of ShKh15SG steel. Some ingots were investigated as cast. The rest of them as forged billets. The process of electroslag remelting results in substantial change of silicon and sulfur content. The desulfurization in this process is very effective: on the average about 30%. The composition of the slag has a substantial influence on the development of oxidation processes and on the degree of desulfurization. It should be remembered that the purity of fluxes is a basic condition for obtaining high quality steel. The process of desulfurization during the electroslag remelting proceeds through the formation of volatile sulfur compounds. The process of electroslag remelting also results in minimum central porosity and other defects (see (Fig. 3).

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Electrometallurgy. Electroslag Remelting of Ball Bearings and Structural Chromium-Nickel-Tungsten Steels

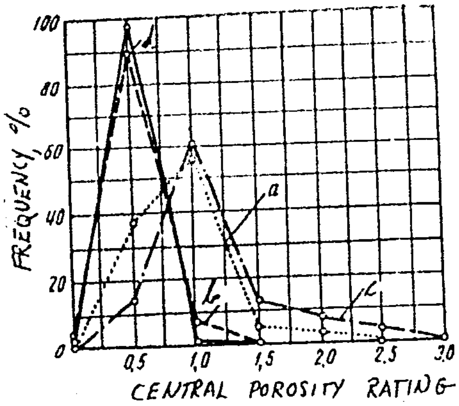

Fig. 3. Frequency diagram of distribution of melts according to the rating of central porosity. (a) Initial steel ShKh15; (b) ditto, electroslag steel; (c) initial steel ShKh15SG; (d) ditto, electroslag steel.

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Electrometallurgy. Electroslag Remelting of Ball Bearings and Structural Chromium-Nickel-Tungsten Steels

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This is the first time that the "Dneprospetsstal'" Plant produced ball bearing steel of such high density. For prevention of porosity the liquid steel bath in the crystallizer should be shallow and the velocity of poured-in liquid steel should be decreased to the point which gives a good surface of the ingot and a stable course of the process. For the study of the process of ingot formation during melt 243 (steel ShKh15SG) small additions of iron sulfide (in 30 g portions) were periodically introduced into the crystallizer. The experiment was conducted by B. I. Maksimovich. The process also improves the purity of metal (see Fig. 5).

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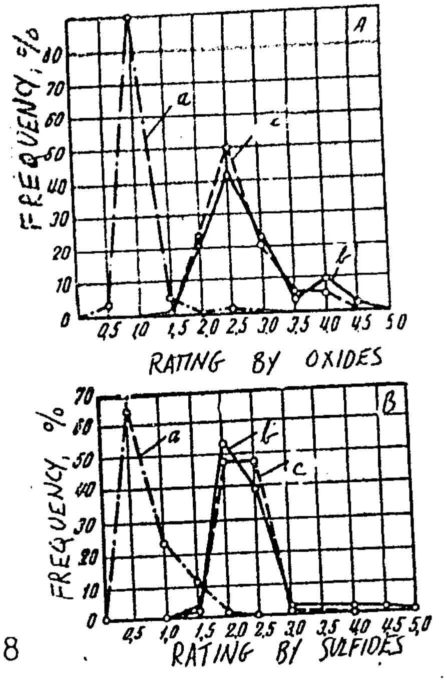

Fig. 5. Frequency curves of contamination by oxides (A) and sulfides (B) of electroslag and ordinary melts of ShKh15 Steel. (a) Electroslag; (b) ordinary melts in one group of furnaces; (c) ditto, in the other group of furnaces.

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Electrometallurgy. Electroslag Remelting of Ball Bearings and Structural Chromium-Nickel-Tungsten Steels

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The 18KhNVA steel was investigated by the method of electroslag remelting (9 melts). The rolled billets of 110 mm diameter, rolled from the ordinary melt ingots, were used as initial material. Two ingots were investigated as cast. The others as forged billets. In the process of test remelting (as in the case of ball bearing steel) the silicon content was reduced by 30% and sulfur content by 41%. The amount of other elements practically did not change. The authors arrived at the following conclusions: (1) All mechanical properties of steel produced by the method of electroslag remelting are considerably higher than those of ordinary electric steel. The excellent density and homogeneity of metal, the absence of macrodefects, the high degree of purity from non-metallic inclusions, and the isotropy of mechanical properties give a right to recommend this method to the electrometallurgical plants for manufacturing steel for most critical applications. (2) It is also

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Electrometallurgy. Electroslag Remelting of Ball Bearings and Structural Chromium-Nickel-Tungsten Steels

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recommended to continue the study of the basic parameters of the process regarding the improvement of crystallization conditions of ingots and the development of optimum composition of fluxes for additional increase of metal purity. There are 7 figures; 4 tables; and 3 Soviet references.

ASSOCIATION: Zaporozh'ye Machine Building Institute and "Dneprospetsstal'" Plant (Zaporozhskiy mashinostroyitel'nyy institut i zavod "Dneprospetsstal'")

Card 8/8

TREGUBENKO, A.F.

6

S/148/60/000/008/002/018
A161/A029

**AUTHORS:** Chuyko, N.M.; Rutkovskiy, V.B.; Konishchev, N.P.; Perevyazko, A.G.; Tregubenko, A.F.; Yatskevich, I.S.; Zatsluyev, I.P.; Kurganov, V.V.; Bobkov, T.M.; Antipenko, O.I.

**TITLE:** A New Smelting Technology Under White Slag for Ball Bearing Steel of Grade ШХ15 (ShKh15)

**PERIODICAL:** Izvestiya vysshikh uchebnykh zavedeniy. - Chernaya metallurgiya, 1960, No. 8, pp. 38 - 47

**TEXT:** At the "Dneprospetsstal'" Works up to 1956 ShKh15 steel was teemed simultaneously with slag and no attention was paid to steel treatment by slag in the ladle during the teeming. The final S content of 0.02% was obligatory and the refining took between 2 h 10 min and 2 h 40 min or more. The refining time had been cut down to 1 h 50 min - 2 h 10 min by addition of ferrochrome into nonreduced metal with a content of 0.025% S. To boost the heat process and to improve the metal quality, N.M. Chuyko suggested to cut the refining time to 1 h 10 min or less by deoxidation and desulfuration of the metal with electric furnace slag in the ladle during teeming. The article contains details of this new

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technique. The effect of the oxidizing and reducing heat period factors was determined. The formation of highly-basic and well deoxidized slag was mainly studied. The slag quantity used was 4 - 5% of the metal weight with a CaO content of over 55%, FeO below 0.4% and $CaF_2$ below 2.0%. First a considerable quantity of slag was spilled through a widely open hole into the ladle, and then metal poured from 3 - 4 m height in a solid jet, which brought about a large contact area with slag and rapid deoxidation and desulfuration. The optimum parameters of the oxidation period were stated to be: $\Delta[C] = 0.3 - 0.5\%$ at a carbon burning rate of 0.4 - 0.5%/h, and a metal temperature of 1,545 - 1,565°C before skimming the oxidizing slag. The reducing period under lime-chamotte white slag with low calcium fluoride content proved to be expedient, as well as the treatment of the metal in the ladle by this slag. The optimum slag composition is: $(FeO) < 0.5\%$; $(CaF_2) = 1 - 2\%$; $\Sigma(SiO_2 + Al_2O_3) = 31 - 34\%$; $(CaO) > 53\%$; $(MgO) < 12\%$, and $\Sigma(CaO + MgO) = 63 - 65\%$. The optimum metal temperature before teeming is 1,550 - 1,570°C; it ensures the filling of a 2.8-ton ingot during 165 - 190 sec. Final deoxidation of steel by aluminum in the ladle gives a high reduction of oxygen content (over 30%). The quantity of nonmetallic inclusions in

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steel was slightly lower than usual in steel smelted in the usual process under carbide slag with long refining. There are 7 figures, 5 tables and 7 Soviet references.

**ASSOCIATIONS:** Dnepropetrovskiy metallurgicheskiy institut (Dnepropetrovsk Metallurgical Institute); zavod "Dneprospetsstal'" ("Dneprospetsstal'" Works)

**SUBMITTED:** November 12, 1959

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S/133/61/000/003/005/014
A054/A033

AUTHROS: Tregubenko, A. F.; Speranskiy, V. G.; Leybenzen, S. A.

TITLE: Electroslag melting of steel

PERIODICAL: Stal', no. 3, 1961, 233 - 238

TEXT: An electric furnace designed by the institut elektrosvarki im. Ye. O. Patona (Institute of Electric Welding im. Ye. O. Paton) for the remelting of steel produced in the conventional arc furnace under slag and for the casting of ingots in water-cooled crystallizers has been in operation since May, 1958. The original furnace was re-designed (Figure 1), with an increased capacity, by A. Ya. Kovalenko and consists of two sets of crystallizers, (3 in each set) which operate alternatively: in one set smelting takes place, in the other prepartions are made. The furnace operates with 2250 kw, 6 - 7 ka and 50 v. In the crystallizers (formerly made of copper, now of steel) circular (300 mm in diameter) or square ingots (310 x 310 mm) are smelted: the weight of the former is 700 - 950 kg and that of the latter 1100 kg. Cooling water is fed into the crystallizer and bottom plate at 3.5 - 5.0 atm pressure, depending on the water temperature. The bottom of

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A054/A033

Electroslag melting of steel ...

the crystallizer is made of copper. There is a support to hold the electrode which in this process functions as the charge. In the most recent construction the crystallizer is made of aeamless tubes. This solved the welding problems and eliminated the development of a crust during smelting which impurifies the metal. Two kinds of fluxes are used in the electroslag smelting process: 1) a solid flux to conduct the electric current, 2) an working flux for the smelting process, usually of the AHФ-6 (ANF-6) type containing about 65 % CaF$_2$, 30 - 35 % Al$_2$O$_3$, 3 - 6 % CaO and maximum 1 % (MgO+SiO$_2$+FeO). A mixture consisting of the ПАМ (PAM) aluminum magnesium powder and the operating flux can also be used as electro-conducting flux. When the furnace is prepared for operation, the inoculator of the crystallizer, made of CT.2 and CT.3 (St.2, St.3) steel discs 295 mm in diameter and 35 mm in height is first fixed to the copper plate, next the inoculator is sprayed with 400 g electro-conducting flux, then the gap between the inner wall of the crystallizer and the electrode is filled with the working flux (23 kg for 700 kg ingots). The transformer is adjusted manually during the first 10 - 15 minutes and, after the stabilization of the process, the furnace is switched over to automatic operation. The smelting process is finished by switching off the mechanism feeding the electrode. After the electric current supply

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Electroslag melting of steel

is stopped, the ingot is cooled for some time, then it is discharged from the furnace mechanically. In this phase of the process the ingot has a temperature of about 1000°C at the top, while it is cooled to a dark grey colour at its base. In 1959 the electroslag remelting furnace (producing 700 - 720 kg ingots) passed the following operation characteristics: Productivity. (including preparations) 460 kg/h; specific electric power consumption 1250 kwh/t; specific electrode consumption 1.02 t/t; Specific ANF-6 flux consumption 35 kg/t; specific cooling-water consumption 240 cum/t (approx.). The effect of electroslag remelting has been investigated for 1Х18Н9Т (1Kh18N9T) stainless steel, ЭИ654 (EI654) high-alloy austenite steel containing aluminum and titanium, 18ХНВА (18KhNVA) and 38ХМЮА (38KhMYuA) structural steels, Р18 (R18) and Р18М (R18M) high-speed steels and Х28 (Kh28) and 2Х13 (2Kh13) grade steels. For all steels it was found that electroslag smelting improves the quality of the metal considerably. Irrespective of the electrode applied, the metal obtains a dense macrostructure almost free from porosity; non-metallic impurities are decreased and the inclusions occurring are not arranged in aggregations. The mechanical properties of the metal are also improved. Since the inclusions are not aggregated, flakes become

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Electroslag melting of steel

also less frequent. In order to prevent losses in titanium caused by electroslag melting, all impurities must be carefully removed from the electrodes used for 1Kh18N9T steel. The sulfur content of this steel decreases by about 40 % compared with its initial content. Even the nitride-inclusions and those of the ferrite-phase disaggregate during electroslag smelting and are arranged uniformly over the cross-section of the ingot. This improves the piercing property of the tube blanks made of this steel. In the EI654 type high-alloy austenite steel electroslog melting decreases the H content from 7 - 10 to 4.5 - 6.0 $cm^3$/100 gr and improves the ductility of this steel, making piercing easier. In the 38KhNVA steel electroslag melting improves the structure, fracture, and mechanical properties, and eliminates spotty liquation. In the Kh28 type steel electroslag melting improves the ductility in hot condition, due to the decrease in non-metallic inclusions. It seems advisable to establish special shops for electroslag melting and to reconstruct the electrofurnaces, so that ingots of larger dimensions can be remelted. There are 4 figures and 2 tables.

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Figure 1: Design of the new three-phase furnace for electroslag melting. (1) rotary column, (2) slide, (3) flexible current conductors, (4) remelted metal, (5) slag bath, (6) crystallizer, (7) remelting rod, (8) support, (9) column, (10) screw, (11) rod clamping fixture, (12) supporting frame, (13) air duct, (14) fan drive, (15) water pump, (16) switch board, (17) furnace leads, (18) transformer, (19) block no. 1, (20) block no. 2.

Fig. 1

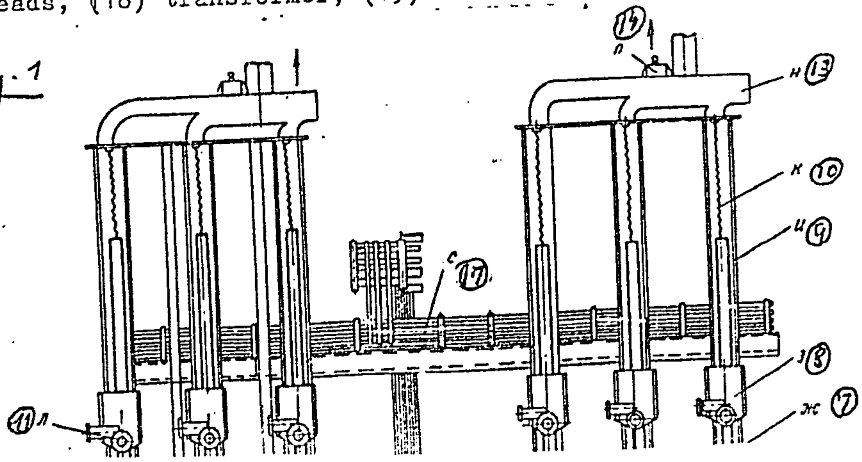

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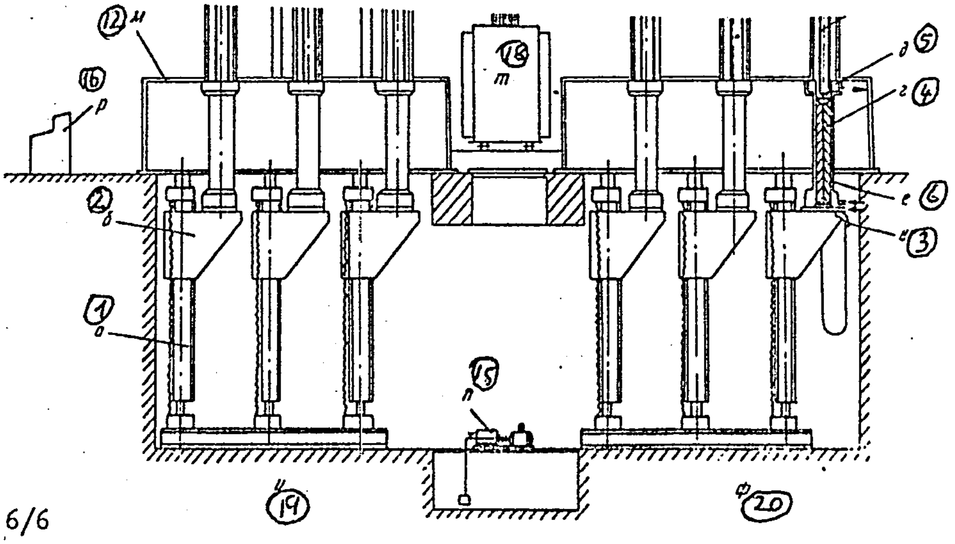
Figure 1 (continued)



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AUTHORS: Gnuchev, S. M., Candidate of Technical Sciences, Trakhimovich, V. I., Tregubenko, A. F., Frantsov, V. F., Bobkov, T. M., Engineers

TITLE: Melting steel in arc-furnace with electromagnetic stirring of the bath

PERIODICAL: Stal', no. 6, 1961, 519-522

TEXT: Electromagnetic stirring was first applied in the USSR, in 1956, to a ДСВ-18 (DSV-18) type furnace (diameter of the working area: 3,070 mm, depth of the bath: 605 mm, tranformer capacity: 8,000 kw); further equipment for stirring was installed in 1959. Tests were carried out to determine the effect of electromagnetic stirring on the oxygen and sulfur content during the reduction period and to examine the efficiency of this process. The metal was stirred in such a way, (Fig. 1a) that after rising from the lower layers at the outlet opening it spread over the bath surface while two rotation centers were forming at the bridge. In the present series of tests the maximum rate of metal movement was 0.25 - 0.40 m/sec at the rear furnace banks and 0.14 - 0.25 m/sec at the frontal furnace banks, with a frequency of 0.95 - 1.0 cps. During the

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tests the electromagnetic stirring went on for the entire period of refining. Based on the results obtained for the electromagnetic stirring of low-carbon structural steels, (12XH3A = 12KhN3A, 15XM = 15KhM) it was found that this process compared with the conventional method accelerated deoxidation considerably, viz. by 30 - 40 minutes. When deoxidizing took place for the usual period, electromagnetic stirring resulted in a more thorough deoxidation (0.003 - 0.005% oxygen content before tapping instead of 0.005 - 0.007% when applying the conventional method). Increased deoxidation by electromagnetic stirring was also recorded for stainless low-carbon steels (0.0035 - 0.0070% oxygen instead of 0.007 - 0.013% in the old process). The distribution coefficient of sulfur during reduction when applying the electromagnetic stirring method was higher, whereas the sulfur-content in the metal was lower than in the usual castings. No increase in hydrogen and nitrogen content was observed, nor did the furnace bottom display any increased wear and tear when electromagnetic stirring was applied. It was possible to accelerate the skimming of slag by 5-10 minutes, which increased the furnace capacity by 10%; moreover, manual labor could be entirely eliminated from this process. The temperature of the metal reached an average value more quickly and could be controlled more easily than in the usual manner. The bath also had a more uniform chemical composition. All these factors

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improved the quality of the metal considerably. It was found that the waste decreased in electromagnetically stirred molten metals. This could be established for 18ХНВА (18KhNVA), 12ХН3А (12KhN3A), 40ХНМА (40KhNMA) steels. The waste in ball bearing steel decreased also, as a result of the drop in globular inclusions, whereas the oxide and sulfide impurities occur in about the same amounts in both processes. The drawbacks of the electromagnetic stirring equipment are: 1) the air-cooling of the stators is insufficient and does not prevent their overheating; 2) on account of the slow motion of the metal at the bath surface it is not possible to mechanize the stirring of slag. For this purpose it would be necessary to raise the current intensity in the stator above the nominal value and to intensify cooling suddenly; 3) in the present construction the bath must first be removed when repairs are necessary, when the stator has to be mounted or dismantled. There are 3 figures, 4 tables and 2 Soviet-bloc references.

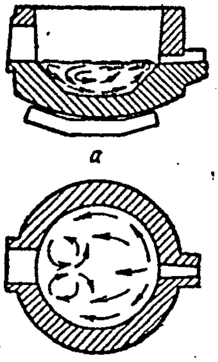

Fig. 1a: Scheme of the metal-circulation in the bath applied in the tests

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18 3200

**AUTHORS:** Shul'te, Yu. A., Doctor of Technical Sciences, Professor; Garevskiy, I. A., Engineer; Leybenzon, S. A., Engineer; Maksimenko, V. D., Engineer; Tregubenko, A. F., Engineer; Speranskiy, B. S., Engineer; Frantsov, V. P., Engineer, and Smolyakov, V. F., Engineer

**TITLE:** Nature of flaws in steel ingots produced by the electro-slag method

**PERIODICAL:** Stal', no. 4, 1961, 322 - 326

**TEXT:** The technology of electro-slag remelting was established by the Institut elektrosvarki im. Ye. O. Patona (Institute of Electrowelding im. Ye. O. Paton). A three-phase electroslag furnace (2250 kW) which can smelt ingots 750 kg in weight and 300 mm in diameter simultaneously in 3 crystallizers has now been in operation for more than 2 years. In order to improve the process, the nature of the flaws occurring in electroslag-remelted steel was studied and tests were carried out on ingots produced on an industrial scale, whereas an A-550 (A-550) laboratory plant, designed by

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the same institute was used for the purpose of reproducing the defects. The
crystallizer of this equipment was 100 mm in diameter, 600 mm in length, the
ingots weighed 30 kg, remelting took about 35 minutes (at 40 v and 1.2 ka).
In this process the ingot surface is not in contact with the atmosphere.
The slag bath is rising at the same rate at which the ingot is smelting,
while a thin slag layer forms on the crystallizer wall, the relief of which
is closely reproduced by the ingot surface. Three zones can be distinguish-
ed in the smelting process. A non-uniform structure, having a serrated sur-
face develops in the bottom zone during heating of the ingot. The metal
contains slag inclusions and flux, at the place of inoculation. This zone
could be reduced by applying a thermite mix (20% saltpeter, 20% aluminum
and magnesium powder, 60% АН-Ф-6 /AN-F-6/ flux) at the exact centre of the
electrode. The slag bath develops more rapidly in the heating period when
maximum power is applied. By controlling the feed of the electrodes manual-
ly, any fluctuations in current intensity could be eliminated. At about
1800°C a homogeneous slag bath is formed, while at the same time the smelt-
ing of the second zone of the ingot also starts; the thickness of the slag
lining on the crystallizer wall decreases to 1.0 - 1.5 mm. In this phase

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the electric system of the crystallizer is switched to automatic operation.
The electrode is fed into the slag bath at a rate corresponding with the
optimum current intensity. Under these stabilized conditions the slag bath
is regularly rising, leaving a smooth lining behind. The third, liquid-
slag zone is the actual smelting zone, both in respect of electric power
and physico-chemical effects. Here takes place the smelting of the elec-
trode and the refining of the metal flow. The height and volume of this
zone are the most important factors of the entire process. The slag con-
tent for all three zones was established. The greater the crystallizer-
diameter, the less slag was found in the lining (Table 1). The ingot sur-
face in the second zone is flawless, smooth and does not require any finish-
ing. This is one of the greatest advantages of this method, which, however,
can be obtained only by a stable electric system, faultless operation of the
automatic furnace control as the slightest disturbance in any of these fac-
tors results in surface defects. These appear in the macrostructure and
are similar to the impurities usually found in electrosteel. In [illegible] data
were compiled for ball bearing steel, showing the relation between the crys-
tallizer height, diameter and amount of defects (Table 2). Thus, the great-
er the diameter of the crystallizer, the more flaws could be observed in

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the ingot. As regards the smelting time, it was found that the first and the last periods produced the greatest number of defects. Metallographic study of faulty rods revealed sickle and spider-shaped cracks, lenticular inclusions, differing in colour from the flawless parts of the metal, in some templates occupying more than 50% of the total surface. In microhardness tests it was observed that in the impurified zones the hardness coefficients displayed a wide range of values. It could also be observed that the flaws penetrate fairly deeply, indicating that the factors impurifying the casting are active a long time (Fig. 5). Petrographic tests proved that the inclusions are similar to those forming in free crystallization and contain mainly calciumfluoride globules, needle-shaped corundum crystals, aluminum-calcium compounds. Among the impurities slag-inclusions, 1 - 2 mm in size, were found in irregular arrangement. Inclusions were present in the low-temperature zones of the metal, promoting the mixing of slag particles in the liquid metal. The lower the crystallization temperature, the more flaws were found. The viscosity of the metal increases due to intensive cooling and this promotes the capturing of slag particles. Based on the tests with the A-550 equipment the permissible minimum length of the

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bottom part of the ingot was defined. It was also possible to prevent the formation of impurities in the top of the ingot by ensuring stable electric operational conditions until the end of the process. The optimum power was obtained with 55 v instead of 40 and 6 ka. However, even the optimum electric parameters only yield flawless casting provided the power conditions are very stable throughout the entire process. By applying these new electrical parameters the impurities could be decreased from 31.6% to 0.7%. In some tests Ya. I. Spektor took part.

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TREGUBENKO, A.F.

PHASE I BOOK EXPLOITATION SOV/6007

Leybenzon, Semen Abramovich, and Aleksandr Fedorovich Tregubenko

Proizvodstvo stali metodom elektroshlakovogo Pereplava (Electroslag Melting of Steel) Moscow, Metallurgizdat, 1962. 237 p. Errata slip inserted. 3200 copies printed.

Ed. of Publishing House: S. I. Venetskiy; Tech. Ed.: A. I. Karasev.

PURPOSE: This book is intended for technical personnel and skilled workmen of the metallurgical and machine-building industries, and for workers of scientific research and planning institutes. It may also be useful to students at schools of higher technical education.

COVERAGE: The book deals with a "new" and "advanced" method of steel-making developed by the Electric Welding Institute im. Ye. O. Paton. This method, designated as the "electroslag melting of consumable electrodes in copper, water-cooled molds" was first

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Electroslag Melting of Steel

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introduced in the Zaporozhskiy electrometallurgical plant "Dneprospetsstal'". The design of the electroslag unit is described. It is pointed out that, by applying the technologically simple process of electroslag melting, it is possible to produce high-quality steel which is dense in macrostructure and pure as regards nonmetallic inclusions. The authors thank professor Yu. A. Shul'te, Doctor of Technical Sciences, Yu. V. Latash, Candidate of Technical Sciences, and B. N. Medovar, Doctor of Technical Sciences, for their valuable comments. There are 30 references, all Soviet.

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TREGUBENKO, A. F.

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AUTHORS: Chuyko, N.M., Doctor of Technical Sciences, Rutkovskiy, V.B., Dinichek, R.Ye., Perevyazko, A.T., Poredulin, G.M., Tregubenko, A.F., Shamil', Yu.P., Frantsov, V.P., Volovich, V.G., - Engineers

TITLE: Blowing inert gases through the metal in the ladle under vacuum

PERIODICAL: Stal', no. 9, 1962, 809 - 811

TEXT: Vacuum treatment of liquid steel promotes the removal of gases and reduces the amount of nonmetallic inclusions. Tests were carried out (in cooperation with I.M. Ioffe, M.I. Lavrent'yev, G.P. Parkhomenko, V.I. Demidenko, Ye.M. Rysin, and T.M. Vorob'yeva, Engineers) to determine the optimum methods of blowing inert gases through the liquid metal in the ladle in combination with the vacuum treatment. The method established does not require special refractory materials, the apparatus used (designed by N.M. Chuyko, Professor and Ye.I. Lavreyev, Engineer) is of a simple design and metal losses through the spout can be prevented. The argon feed can be controlled very closely by means of 3 rotameters [PC-7 (RS-7) type], having 30 standard $m^3/h$ capacity and supplied with

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needle valves. The test steel [ ШХ15 (ShKh15)] was smelted in four versions: I. blowing through the reduced metal in the ladle under atmospheric pressure; II. the same, under vacuum; III. vacuum treatment of non-reduced metal, containing less than 0.05% Si, in the ladle and reduction with ferrosilicon and aluminum at the end of the process; IV. blowing through non-reduced metal in the ladle under vacuum, with addition of ferrosilicon and aluminum at the end of blowing. Ferrosilicon was added in an amount to ensure 0.27 - 0.28% Si content in the metal, the amount of aluminum added was 0.5 kg/ton. The technically pure argon gas contained 0.003 - 0.009% oxygen and maximum 0.01% nitrogen. The hydrogen content of the metal (both in reduced and non-reduced condiction) could most efficiently be removed when argon gas was blown through at residual pressures of 10 - 12 mm mercury column in the vacuum chamber, with a blowing time of at least 8 min. A maximum reduction of the oxygen content can be obtained by blowing gas into the ladle through non-reduced metal under vacuum (IV). With regard to nonmetallic inclusions the best results are attained by versions III and IV. Some of the heats were entirely without spheroidal inclusions. The amount of oxygen and of impurities also depends on the degree of reduction of the slag, in view of the intensive mixing of metal and slag during blowing. The

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lowest oxygen content (0.0019%) and the smallest number of oxide and spheroidal inclusions are ensured when argon is blown in amounts of 0.05 - 0.06 $m^3$/ton, under vacuum, at remanent pressures of 18 - 30 mm Hg. The intense stirring of the metal caused by the argon gas blown into the ladle also causes a uniform distribution of silicon in the bottom part of the ladle and its complete adsorption. There are 3 figures. The English-language reference is: Iron and Steel Engineer, 1959, v. 36, no. 9 (September), 192.

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Odesskogo meditsinskogo instituta imeni Pirogova.

TREGUBENKO, Anatoliy Ivanovich [Trehubenko, A.I.]; DEYNEKA, I.Ya., zasl. deyatel' nauki, prof., red.; [illegible], L.S. [translator]

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TREGUBENKO, G.P.

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